ATP and the Adaptive Learning Systems Program

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Workshop on Adaptive Learning Systems

November 17, 1999   1999 ATP National Meeting

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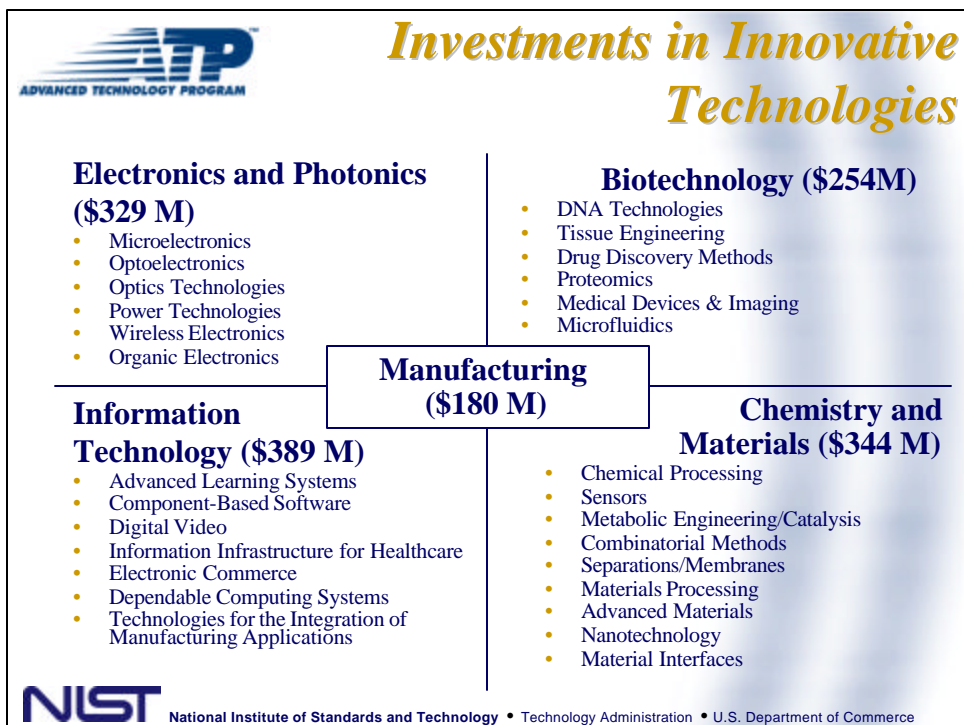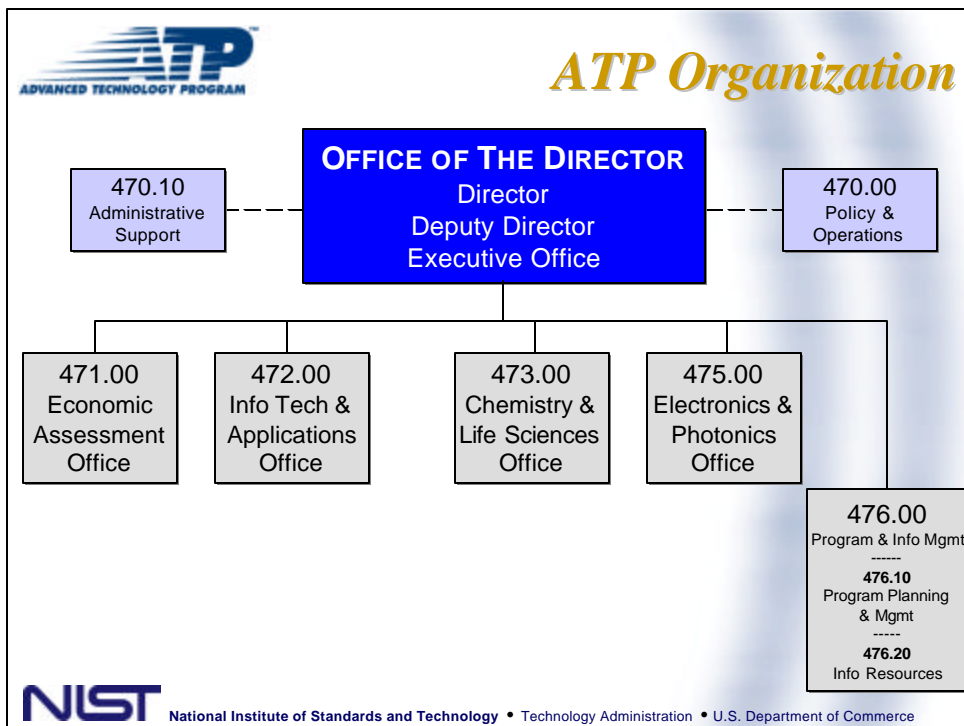

ADVANCED TECHNOLOGY PROGRAM

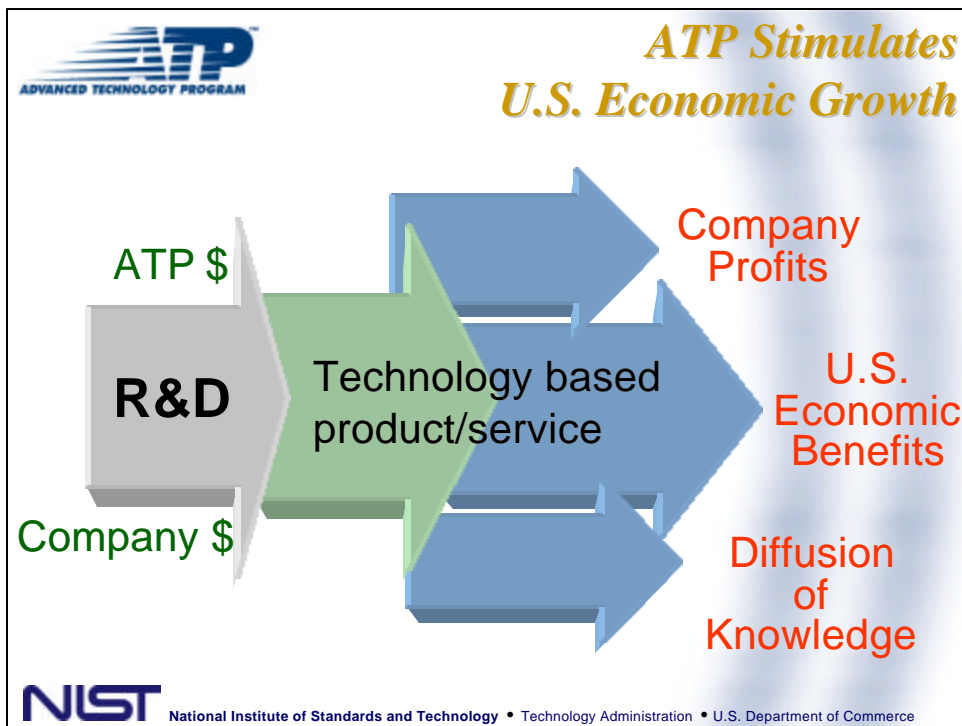## Who We Are … One of 4 parts of the

National Institute of Standards & Technology (NIST)

- Advanced Technology Program - $200M

- Measurements & Standards Laboratories - $300M

- Manufacturing Extension Partnership - $100M

- National Quality Program - $5M

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ATP Organization

OFFICE OF THE DIRECTOR
Director
Deputy Director
Executive Office

470.10
Administrative Support

470.00
Policy & Operations

471.00
Economic Assessment Office

472.00
Info Tech & Applications Office

473.00
Chemistry & Life Sciences Office

475.00
Electronics & Photonics Office

476.00
Program & Info Mgmt

476.10
Program Planning & Mgmt

476.20
Info Resources

Investments in Innovative Technologies

Electronics and Photonics ($329 M)
- Microelectronics
- Optoelectronics
- Optics Technologies
- Power Technologies
- Wireless Electronics
- Organic Electronics

Biotechnology ($254M)
- DNA Technologies
- Tissue Engineering
- Drug Discovery Methods
- Proteomics
- Medical Devices & Imaging
- Microfluidics

Manufacturing ($180 M)

Information Technology ($389 M)
- Advanced Learning Systems
- Component-Based Software
- Digital Video
- Information Infrastructure for Healthcare
- Electronic Commerce
- Dependable Computing Systems
- Technologies for the Integration of Manufacturing Applications

Chemistry and Materials ($344 M)
- Chemical Processing
- Sensors
- Metabolic Engineering/Catalysis
- Combinatorial Methods
- Separations/Membranes
- Materials Processing
- Advanced Materials
- Nanotechnology
- Material Interfaces

ATP Stimulates U.S. Economic Growth

ATP $

R&D

Company $

Technology based product/service

Company Profits

U.S. Economic Benefits

Diffusion of Knowledge

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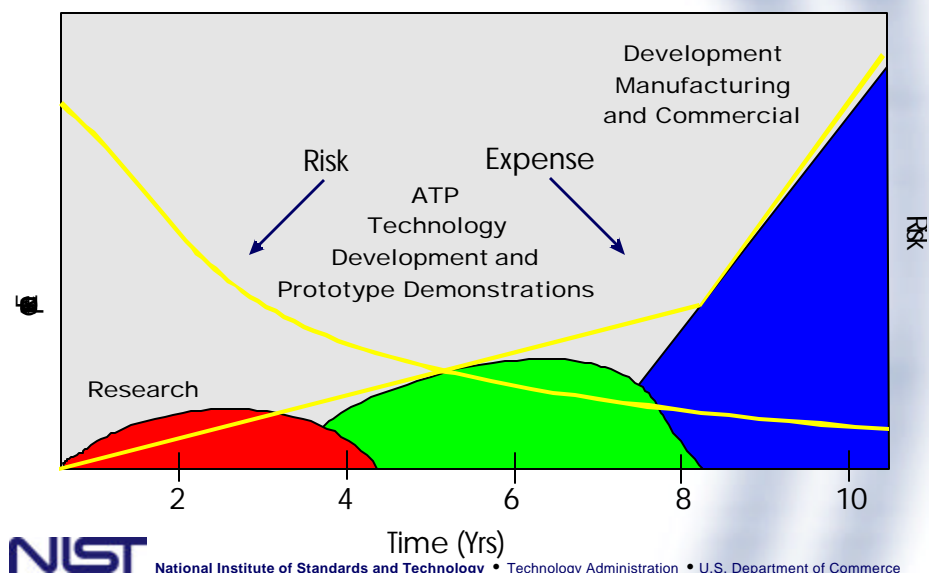

ATP Mission

The ATP does NOT…

- Supplant private capital
- Fund basic research
- Fund product development

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ATP's Role in Technology Development
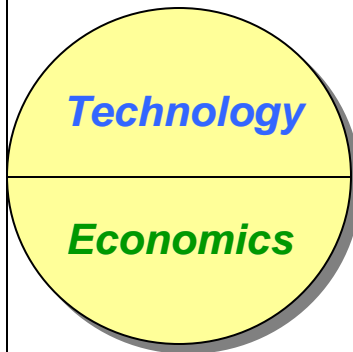
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A Decade of Innovation

- The Program is celebrating its 10th Year
- 468 projects co-funded with 1,067 participants and 1,027 subcontractors (157 Joint Ventures)
- $3 billion of advanced technology development funded
  - ATP Share = $1.496 billion
  - Industry Share = $1.499 billion
- Small businesses are thriving
  - > 50% of projects led by small businesses
- More than 145 Universities participate
- Nearly 20 national laboratories participate

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ATP Criteria

What We Look For in a Proposal

Technology

Economics

- Scientific and Technological Merit (50%)
  - ✓ Innovations in the Technology
  - ✓ High Technical Risk & Feasibility
  - ✓ Quality of R&D Plan

- Broad-Based Economic Benefits (50%)
  - ✓ Economic Benefits
  - ✓ Need for ATP funding
  - ✓ Pathway to Economic Benefits

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Adaptive Learning Systems Program Drivers

End-user demands
- learners and workers
- educators and trainers

Current situation
- ed-tech too costly, isolated, static, difficult to use
- re-evaluation and restructuring in training and education

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Program Goals

TECHNICAL

Revolutionary improvements in:

– production and delivery
– search and retrieval
– quality of service (QoS) in distributed instructional systems

BUSINESS

Transform ed-tech markets, by delivering content that is:

– affordable
– accessible
– adapted to learner and educator requirements

Scope

CONTENT & AUTHORING
– intelligent authoring tools
– integrated learning resources

SEARCH & RETRIEVAL
– automated knowledge acquisition
– instructional component libraries

MODES OF DELIVERY
– simulated environments
– collaborative interaction

QUALITY OF SERVICE
– performance support & services

Inclusions

- Open, reusable, integrated, and scalable
- Adapted to user requirements and environments
- Creative uses of client, server, and network
- Appropriate workload on learner and educator
- Measurable improvements in affordability, accessibility, adaptability
- Focus on U.S. Workforce
- New Business Models

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Adaptive Intelligent Learning System
eCollege.com

Aim: a Web-based intelligent tutoring system.

Innovation:
**combining Latent Semantic Analysis (meaning-based text
 retrieval) and Radial Basis Function (a neural network) to
 improve search accuracy through machine learning.**

Benefits:
**improved retrieval rates for relevant documents;
automatic meta-tagging by accepted classification schema;
better hyper-links across disparate knowledge sources.**

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Courseware Conversion Factory
Teknowledge Corporation

Aim: rapid, high-volume conversion of heterogeneous content.

Innovation**:**
KB systems for capture, conversion, interoperation, reuse;
system of hierarchies and meta-tags tailored to instruction;
interoperable software for wrapping and scripting.

Benefits:
robust, usable tools for authoring and conversion;
diverse education and training testbed;
participation by ed-tech industry leaders.

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Adaptive Web Learning Guides
Extempo Systems, Inc.

Aim: animated computer "guides" to enhance access to World
 Wide Web-based educational material in many fields and industries

Innovation:
exploit and integrate existing ideas and designs from artificial
intelligence, instructional systems, and cognitive research on
student preferences and teaching strategies

Benefits:
new forms of learning systems, extend the reach of educators,
help provide access to learning experiences for users who are
not computer savvy, and help workers acquire new job skills.

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1999 Competition

Single Competition
Competition 99-01
Proposals due April 14, 1999 at 3 p.m. Eastern Time
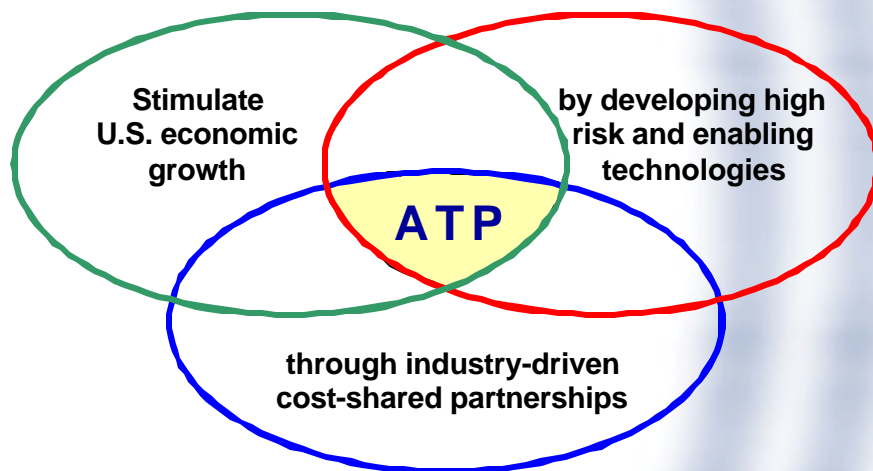$66 million in first-year funding for new awards

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ATP Mission

Stimulate
U.S. economic
growth

by developing high
risk and enabling
technologies

ATP

through industry-driven
cost-shared partnerships

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